

SYSTEM AND METHOD FOR MANAGING A HOLD QUEUE BASED ON
CUSTOMER INFORMATION RETRIEVED FROM A CUSTOMER DATABASE

FIELD OF THE INVENTION

This invention relates to automated telephone systems and more particularly to a system and method for managing telephone calls that have been placed on hold and are held in a hold queue.

BACKGROUND OF THE INVENTION

Automated telephone systems are in widespread use among users such as telemarketing, credit collecting and reservation services. Users of such system desire to optimize system performance by attempting to ensure nearly 100% operator productivity while minimizing the number of calls which are placed into a hold queue while waiting for an available operator. This concern arises from the fact that customers who are placed on hold will at some point hang up and be lost.

Several prior art systems and methods have been developed to prioritize the order in which calls placed on hold are answered. However, all have been met with limited success. Early systems and methods include prioritizing the on-hold calls based upon the telephone number dialed. For example, long distance callers who

1 are on hold may be handled before on-hold local callers. Another
2 method involves prioritizing the on-hold calls strictly by age or
3 the length of time the call has been placed on hold. However,
4 this method fails to recognize the non-uniformity in the
5 willingness of customers to remain on hold based upon the length
6 of time the caller has been on hold. For example, a customer who
7 has been on hold for 30 or 40 seconds may not be more apt to hang
8 up than a customer who has been on hold for 10 seconds or less.
9 Another example is that customers are more apt to hang up when a
10 message is played during the hold interval. Additionally, such
11 non-uniformity in hold tolerance will vary and change from user to
12 user and from call campaign to call campaign.

13 In order to address the above-identified concerns, more
14 sophisticated hold queue management systems were developed. An
15 example of one such sophisticated system is disclosed in U.S.
16 Patent No. 5,278,898, which issued on Jan. 11, 1994 to the
17 assignee of the present application and which is incorporated
18 herein by reference. The '898 Patent discloses a system including
19 a method for managing calls on hold connected to an automated
20 telephone system by allowing the system to prioritize the calls on
21 hold according to selectable, dynamically controllable priority
22 criteria. This system places connected calls on hold and a call
23 record corresponding to each of the calls placed on hold is
24 inserted into a hold queue. Each of the call records includes at
25 least a first portion identifying the connected call and a second,
26 call prioritizing portion, which includes predetermined indicia

1 from which call prioritizing may be accomplished. A hold queue
2 prioritizer prioritizes the call records in the hold queue
3 utilizing the predetermined indicia and established a number of
4 call priority categories.

5 Like all of the prior art systems, even this sophisticated,
6 prior art hold queue management system suffers from a significant
7 drawback; namely, it relies solely upon information received from
8 the call itself for prioritization purposes. It fails to take
9 into account the fact that modern automated telephone systems may
10 have the capability of accessing a wealth of information regarding
11 customers that may be stored in a customer database. This
12 information may be vital to the proper prioritization of a
13 telephone call that is placed in a hold queue.

14 Accordingly, there is a need for a system and method of
15 prioritizing telephone calls in a hold queue that accesses a
16 customer database, retrieves information about the customer that
17 is relevant to the prioritization of a telephone call and
18 prioritizes the calls in the hold queue based, at least in part,
19 upon the information it retrieves from the customer database.

20 SUMMARY OF THE INVENTION

21 The present invention provides a system, including a method
22 for prioritizing on hold calls connected to an automated telephone
23 system by utilizing customer information retrieved from a customer
24 database. The method begins by connecting a plurality of calls to
25 the automated telephone system. Caller identifying information is

1 obtained from each connected call and each connected call is
2 placed on hold. Then, a customer database is searched and a
3 customer database record is identified corresponding the obtained
4 caller identifying information for each connected call. Selected
5 information, which is relevant to the call prioritizing decision
6 is retrieved from the identified customer database record(s). A
7 call record for each connected call is then created and inserted
8 into a hold queue. Each call record includes the caller
9 identifying information and call prioritizing information
10 corresponding to the connected call. The connected calls are then
11 directed to available agents based on the call prioritizing
12 information stored in each call record in the hold queue.

13 The system includes a call receiver/director for receiving a
14 plurality of calls connected to an automated telephone system and
15 for directing the plurality of connected calls to a plurality of
16 call center agents coupled to the call receiver/director,
17 responsive to the hold queue prioritizer described hereinafter.
18 The system also includes customer database, which includes a
19 plurality of customer database records, which include caller or
20 customer identifying information and a wealth of additional
21 information regarding the customer, including information relevant
22 to a call prioritizing decision.

23 A hold queue prioritizer is also included. The hold queue
24 prioritizer obtains the caller identifying information from each
25 connected call and searches the customer database to identify a
26 customer record or records that includes the caller identifying

1 information it obtained from each connected call. The hold queue
2 prioritizer then retrieves information from the identified call
3 record(s), which is relevant to the call prioritizing decision.

4 A call record is then generated by the hold queue
5 prioritizer, which includes the caller identifying information and
6 the call prioritizing information for each connected call.

7 Finally at least one hold queue is provided, which is coupled
8 to the hold queue prioritizer. The hold queue includes a
9 plurality of memory locations in which a corresponding plurality
10 of call records may be inserted.

DESCRIPTION OF THE DRAWINGS

11 These and other features and advantages of the present
12 invention will be better understood by reading the following
13 detailed description, taken together with the drawings wherein:
14

15 Fig. 1 is a block diagram of a system for prioritizing call
16 records in a hold queue based on customer information maintained
17 in a customer database, according to one embodiment of the present
18 invention;

19 Fig. 2 is a flow chart of a method for prioritizing call
20 records in a hold queue according the one embodiment of the
21 present invention; and

22 Fig. 3 is a more detailed flow chart of a method for
23 prioritizing call records in a hold queue showing alternative
24 methods of selecting a call to connect to an available agent.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The system for prioritizing calls on hold in a hold queue according to the present invention is shown within dashed line 10 in Fig. 1. The on hold call prioritizing system 10 includes a call receiver/director 12, which is coupled to one or more telephone lines 14. Call receiver/director 12 is typically a private branch exchange (PBX) telephone switching system that can connect to and switch a number of telephone lines. In the preferred embodiment, the PBX or similar telephone line switch forms a part of an automated telephone calling/answer system. Such systems are well known to those skilled in the art and include systems such as the CAS 2000 and CRS 2000 systems, available from DAVOX Corporation of Westford, Massachusetts.

Call receiver/director 12 is also coupled to one or more call center agent terminals 16, which are capable of being connected to at least one telephone line 14. The call receiver/director 12 also monitors and keeps track of the availability of one or more agents at the call center agent terminals 16. The agent terminals are described in greater detail in U.S. Pat. No. 5,164,981, entitled Voice Response System with Automated Data Transfer, which issued to the assignee of the present invention on November 17, 1992 and which is incorporated herein by reference.

In the preferred embodiment, the agent terminals 16 are also capable of simultaneously connecting to a computer system 18, including a customer database 20, which includes a plurality of customer database files or records. The customer database records

1 include information regarding a plurality of callers or customers,
2 including identifying information as well as information that may
3 be useful in aiding the on hold call prioritizing system of the
4 present invention in making a determination as to which calls on
5 hold should be handled on a priority basis.

6 For example, a database record may identify a customer as the
7 holder of a "gold" or "platinum" credit card, in which case a call
8 related to that account would be flagged as a priority call.

9 Other information that may be stored in a particular customer
10 database record, such as a record of a recent purchase that may be
11 an indicator that the particular customer is a likely candidate to
12 purchase a specific article or service through a telemarketing
13 firm. In any event, the customer database is an integral part of
14 the present invention for it is the information contained therein
15 that is utilized by the hold queue call prioritizing system in its
16 prioritizing decision.

17 Upon the connection of one or more calls over telephone lines
18 14 to the call receiver/director 12, the call receiver/director
19 obtains caller identifying information from the connected call. In
20 one embodiment of the invention, the caller identifying
21 information may include a telephone number from which an incoming
22 call is placed. This can be obtained using well known automatic
23 number identification (ANI) systems as well as other "call
24 tracker" systems and methods. In another embodiment, the call
25 receiver/director may obtain caller identifying information
26 directly from the caller using an integrated voice response (IVR)

1 unit, such as the one described in greater detail in the above-
2 identified U.S. Pat. No. 5,164,981. Of course, other systems and
3 methods of obtaining caller identifying information from a caller
4 are contemplated by the invention.

5 When the call receiver/director obtains the caller
6 identifying information from a connected call, it places the
7 connected call on hold and forwards the connected caller
8 identifying information to a hold queue prioritizer 22. Upon
9 receipt of the caller identifying information corresponding to
10 each connected call that has been placed on hold, the hold queue
11 prioritizer searches the customer database 20 to identify any
12 customer records that include the same caller identifying
13 information it received from the call receiver/director 12. If
14 one or more customer records are identified, then the call queue
15 prioritizer will retrieve selected information from the identified
16 customer record(s) that is relevant to prioritizing the connected
17 call.

18 In credit collection scenarios, examples of call prioritizing
19 information include the type of account, the outstanding balance,
20 the age of the outstanding balance and other like information.
21 For telemarketing scenarios, examples of call prioritizing
22 information may include customer buying trends or specific
23 customer purchase transactions that would be related to the goal
24 of the current telemarketing campaign.

25 Once the hold queue prioritizer retrieves the relevant call
26 prioritizing information or data, it creates a call record 24 for

1 each connected call that is placed on hold. Each call record
2 includes both the caller identifying information that the hold
3 queue prioritizer received from the call receiver/director as well
4 as the call prioritizing information that it retrieved from the
5 customer database record(s). The call records 24 are then
6 inserted into a hold queue 26, until the on hold connected calls
7 are connected to an available agent 16.

8 The hold queue 26 typically includes a plurality of storage
9 locations such as registers or memory locations in which the
10 plurality of call records are stored. As indicated above, each
11 call record 24 preferably includes a caller identifying portion
12 27, which identifies the connected call by a number, telephone
13 line or other similar identification indicia. Each call record
14 also includes a call prioritizing portion 28, which is related to
15 the call prioritizing information that the hold queue prioritizer
16 22 retrieves from the customer database records.

17 In one embodiment, the call prioritizing portion 28 may
18 include raw data retrieved from the customer database records, an
19 example of which may include the letter "P" to indicate that the
20 pertinent caller on hold is a platinum credit card holder. In
21 other embodiments, the call prioritizing portion 28 may include a
22 call prioritization index, which is derived by the hold queue
23 prioritizer 22 based on one or more pieces of information that it
24 retrieves from a customer database record. Examples of call
25 prioritization indices include alphabetical call priority
26 designations, such as "H", "N" and "L", representing high, normal

1 and low priority calls, respectively.

2 Alternatively, call prioritization indices may include call
3 numeric call priority scores. Such scores may absolute or
4 relative scores. With the former, multiple connected calls may be
5 assigned identical call priority scores, in which case a
6 subsequent decision process must be employed in order to determine
7 which of the calls having the same call priority score should be
8 connected to an available agent first. Examples of supplemental
9 decision strategies included first-in, first-out (FIFO) or last-
10 in, first-out (LIFO) strategies for identically scored connected
11 calls. Of course more sophisticated supplemental decision
12 strategies that take into account the precise nature of a specific
13 connected call and non-uniformities associated therewith, such as
14 those described in U.S. Pat. no. 5,278,898, are also contemplated
15 by the present invention.

1 With relative numeric call priority scores, a connected call
17 can be directed to available agent when it has the highest (or
18 lowest depending on the strategy employed) numeric call priority
19 score of all of the call records stored in the hold queue. Of
20 course such a relative numeric call priority score embodiment will
21 include the ability to dynamically adjust the relative call
22 priority scores assigned to the call records included in the hold
23 queue as additional call records are inserted into the queue.

24 The present invention also includes a method of prioritizing
25 connected calls in a hold queue, which is illustrated in the flow
26 charts of Figs. 2 and 3. The method 100 begins by connecting a

1 plurality of calls to an automated telephone system, step 110. As
2 each call is connected, the automated telephone system, and in
3 particular the system's call receiver/director, obtains caller
4 identifying information from each connected call, step 120. This
5 step contemplates a wide variety of "call tracker" means for
6 obtaining various types of caller identifying information, such as
7 the ANI and IVR systems mentioned above. The connected call is
8 then placed on hold, step 130.

9 Once a connected call is identified and the call is placed on
10 hold, the automated telephone system, and in particular, the hold
11 queue prioritizer, searches a plurality of customer database
12 records maintained in a customer database to identify customer
13 database records that correspond to the caller identifying
14 information received from a connected call, step 140. The
15 customer database is provided by the customer and is usually the
16 corporate customer information typically residing on a main frame
17 computer. One or more types of information obtained by the "call
18 tracker" system can be used to search the customer database to
19 find corresponding records.

20 In step 150, the hold queue prioritizer retrieves information
21 stored in the identified customer database records that may be
22 relevant to a call prioritization decision. As indicated above, a
23 wide variety of information may be relevant to a specific
24 connected call depending upon the precise nature of the call.
25 Therefore, the system allows a system supervisor to program the
26 system to look for different types of customer information in the

1 customer database records.

2 Once a connected call is identified and call prioritizing
3 information is retrieved from the corresponding customer database
4 records, the call queue prioritizer creates a call record for each
5 connected call, step 160. Each call record includes both the
6 caller identifying information and the call prioritizing
7 information or a derivative thereof, as such as the alphabetic or
8 numerical call priority indices or scores explained earlier.

9 Each call record is then inserted into a call hold queue,
10 step 170. The automated telephone system then directs the
11 connected calls to a plurality of available agents based on the
12 call prioritizing information included in each call record stored
13 in the hold queue, step 200.

14 Fig. 3 shows, in more detail, two alternative embodiments
15 contemplated by the invention for directing connected calls to
16 available agents, step 200 of Fig. 2. (Steps 110-160 in Fig. 3
17 are identical to the identically numbered steps explained above
18 with respect to Fig. 2.)

19 In a first embodiment of the invention, when a call center
20 agent completes a previous call, that call center agent becomes an
21 available agent. Once an agent becomes an available agent, the
22 automated telephone system will display a list of the call records
23 in the call hold queue, including the connected call identifying
24 information and the corresponding prioritizing information, on the
25 agent display, step 210. The available agent thereafter selects a
26 call to direct to the available agent based on the displayed call

1 prioritizing information, step 220. In this embodiment, the
2 available agent may manually select a call to direct to that agent
3 irrespective of its relative position in the hold queue. In
4 addition, since certain agents may have expertise in handling
5 certain types of calls, different agents may select calls based on
6 both the connected call identifying information as well as the
7 call prioritizing information. For example, a Spanish speaking
8 agent may select a call to handle that has a lower priority than
9 an incoming call from an English speaking customer. Thus, this
10 embodiment would allow a great deal of real-time agent decision-
11 making in the call handling process.

12 In a second embodiment, the automated telephone system
13 compares the prioritizing information retrieved for each call
14 record with at least one predetermined prioritization attribute,
15 step 212. Then, the system arranges the call records in the hold
16 queue in a prioritized order according to the prioritizing
17 information comparison, step 222. Finally, in this embodiment,
18 the automated telephone system automatically directs the call that
19 is at the top of the call record arrangement to an available
20 agent, step 232. Since this second embodiment envisions an
21 automated decision process, the decision criterion must be capable
22 of being updated from time to time by a system supervisor. In
23 addition, this automated decision making embodiment also allows
24 the call records in the hold queue to be re-arranged or re-ordered
25 as additional call records are inserted into the queue.

26 Accordingly, the disclosed system and method improves upon

1 the prior art by allowing calls on hold to be prioritized based on ,
2 customer information that is retrieved from customer database
3 records stored in a customer database, which information may be
4 more relevant to the prioritization decision than information that
5 is obtained directly from a connected call, such as, for example
6 from ANI or IVR systems.

7 Modifications and substitutions by one of ordinary skill in
8 the art are considered to be within the scope of the present
9 invention which is not to be limited except by the claims which
10 follow.

11 What is claimed is:

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